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ABSTRACT

The Career Education Cognitive Questionnaires were originally developed in 1973. The tests are designed to measure cognitive knowledge about the world of work for children in grades one through nine. Revisions were made in each of the three tests based upon item analysis and teacher reviews. Following revisions, test-retest reliabilities were obtained by grade level for each of the three tests. The validation portion of the study was designed to identify face and content validity as well as estimates of vocational maturity and differences between groups or levels of sex, teacher emphasis, levels of father's education, and father's occupation. (Author)

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The Revision and Validation of a Set of Career Education Cognitive Evaluation Instruments

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DEVELOPMENT OF THE CAREER EDUCATION COGNITIVE QUESTIONNAIRE FOR GRADES ONE THROUGH NINE

During the school year 1972-73, members of the staff of the Minnesota Research Coordinating Unit for Vocational Education at the University of Minnesota developed a set of career education evaluation instruments. These instruments were designed for use in Minnesota's eight funded career education sites to obtain a summative evaluation of the impact of career education on students enrolled in programs at the eight sites.

Instrument Development

Career Education Cognitive Questionnaires for grades 1-3, 4-6, and 7-9 were based upon the "Rationale for Education for Work" (Moss, Smith, and Copa, 1972). The "Rationale for Education for Work" states that society is composed of an aggregate of individuals who share a way of life. It is the ultimate goal of society to maximize the self-actualization of each individual and to improve the quality of this shared way of life. Given this purpose of society, education is perceived as a sequence of planned learning experiences designed to facilitate self-actualization and interaction through the roles people are expected to play. The role activities which help bring about self-actualization and an increase in the quality of the shared way of life can be classified as either income-producing or income consuming. The income-producing activities can be further classified as income earning (wages, salaries, and earnings) or income savings. From an economic point of view, work is the activity entered into by the individual for the purpose of income earning or income savings, either for the individual or for his designate(s). A "career" is made up of person's work activities throughout his/her work history (Moss, Smith, and Copa, 1972).

The CECQ were developed to measure how much children know about concepts relating to the world of work. During the initial test development, nine content areas were identified which were believed to span important knowledges. These content areas are shown in Figure 1 with intermediate knowledges listed below each of the nine content areas. The intermediate knowledges were used to identify specific content for questions on each of the three tests.

Revised Forms of CECQ

The three Career Education Cognitive Questionnaires developed during 1973 were revised in 1975. This revision was necessary in order to update many questions due to our changing society. Another reason for revisions involved increasing the psychometric properties of the test. The revised forms of the CECQ are now available with the older versions eliminated from further use.

Description of Original Instruments Before Revisions

A separate evaluation instrument was designed for the occupational awareness stage (grades K-3), the occupational orientation stage (grades 4-6), and the occupational exploration stage (grades 7-9).

The CECQ 1-3 was designed for career development Stage I and consisted of the following content areas (shown in Figure 1): (a) industry, (b) occupational levels, (c) ability requirements, (d) needs (and/or job satisfaction), and (e) working condition (or characteristics); although the career development Stage I is appropriate for grades K-3, the CECQ 1-3 was designed for only grades 1-3.

The test items utilized photographs of workers and working conditions. The test was designed to be read to the children followed by having them place an "X" under the photograph best answering the question. A total of 29 items were selected from forms A and B based upon the item analysis conducted after the pilot test.

The CECQ 4-6 included 52 matching and multiple choice items. The content areas represented in this instrument included all those used for the CECQ 1-3 plus career decision-process (see Figure 1). After consulting with a reading specialist, the tests were designed so that students could read and answer each question at individual paces.

The CECQ 7-9 consisted of 56 multiple choice questions. In addition to items selected for all previously mentioned content areas, the CECQ 7-9 included items having the content area of Employment Trends. This evaluation instrument was designed so that students could read and respond to questions at their own pace.

During 1974-75, each of the three CECO instruments were revised using complete item analysis and inservice teacher recommendations.

Figure 1

CONTENT DOMAINS AND ELEMENTS OF CONTENT FOR CAREER EDUCATION TESTS 1 - 9

Industry	Occupational Level	Ability Requirements	Needs	Working Condition	Career Decision Process	Employment Trends
Construction	Professional & Technical	Mental Verbal Numerical Spatial Reasoning Reaction Time	Ability Utilization	Training Time	Personal Characteristics	Industrial Growth & Decline
Manufacturing	Managers & Owners	Physical Strength & Size Sex Coordination & Dexterity Senses Age Reaction Time	Achievement	Aptitudes	Sources of Occupational & Educational Information	Trends in Employment of Women
Natural Resources	Clerical	Scholastic Aptitude Basic Learning Skills Interpersonal Skills Occupational Skills Non-Work Skills	Activity	Temperaments	Career Expectations	Causes of Employment Growth & Decline
Transportation	Sales		Advancement	Interests	Career Capacities	
Marketing & Advertising	Craftsmen		Authority	Physical Capacities	Career Opportunities	
Communication	Operatives		Company Policies & Practices	Working Conditions	Selection of School Subjects	Impact of Technology on Employment
Government & Finance	Service Personnel		Compensation		Relationship of School to Career Choices	
Public Utilities	Laborers		Co-Workers			
Education & Research			Creativity			
Health & Welfare			Independence			
			Moral Values			
			Recognition			

Figure 1

Continued

Industry	Occupational Level	Ability Requirements	Needs	Working Condition	Career Decision Process	Employment Trends
Recreation Art & Entertainment Personal Consumer & Homemaking		Specialized Occupational Skills Professional Skills Occ. Skills Ed. Skills Voc-Tech. Skills Attitudes Cog. Skills Manipulative Skills	Responsibility Security Soc. Status Supervision Human Rel. Supervision Technical Variety Working Cond. Autonomy			

TECHNICAL REPORT OF CAREER EDUCATION COGNITIVE QUESTIONNAIRES

In order to obtain measures of reliability for each of the three tests, a sample of students at grades one through nine were administered one of the Career Education Cognitive Questionnaires. Two weeks later, they were again administered the same test. A correlation between the initial test scores with the retest scores provide a measure of the test's stability over time.

Validation of the three Career Education Cognitive Questionnaires take the form of face and content validity as well as correlating the instruments with the variables of grade level, amount of teacher emphasis given to career education, sex, father's occupational level, and father's educational level. The variable of grade level was selected based upon the belief that scores should increase with maturity. Amount of teacher emphasis given to career education should be directly proportional to student test scores (presuming other variables are controlled). Sex should theoretically, have no effect upon test scores. Father's occupational and educational levels were variables selected as measures of socio-economic status (Forrest, 1971; Super, 1971; Hamburger, 1958). The higher the socio-economic status the higher student test scores are likely to be because of the opportunities provided for learning at home.

The Career Education Cognitive Questionnaire was administered to 976 students at two career education sites in Minnesota. Four classes of students at each of the nine grade levels were utilized. These students were administered the appropriate test for their grade levels, and two weeks later they were again administered the original test.

Information was obtained from the teachers regarding the amount of time spent on the subject matter which the tests were designed to measure between the two testings. An analysis of this information showed that most teachers devoted less than 30 minutes during the two weeks to career education cognitive information. However, there were two teachers who devoted over two hours to career education concepts during the two-week interval. Since these two teachers were in a minority, it was assumed that classroom instructions had little influence upon student scores on the retest.

Reliability

The test-retest reliability obtained consists of a person-product moment correlation. During the analysis of the results those students who were absent from either the initial testing session or the retest were eliminated.

Face Validity

A sample of fifteen (15) in-service teachers, with five (5) teachers assigned to each evaluation instrument, were asked to respond to the following

questions: 1. Does each test question depict a career education concept? 2. Does the concept depicted by each question represent an "important" career education concept? 3. How much emphasis, in their behalf, should be placed on the concept depicted by each question?

Content Validity

The fifteen (15) teachers who reviewed the three cognitive career education instruments also reviewed and judged the content of each test question.

Five teachers at each of the three test levels were asked to classify each item into the content areas for which the tests were designed. It was theorized that if each item can be classified into one of the content areas for which the tests were designed, and the classifications made by the teachers were similar to those made by the test developers, the test could be judged to have content validity.

The content areas of Figure 1 were renamed and grouped to obtain a more independent content classification scheme. This regrouping was necessary so that teachers could better understand the content areas (also referred to as concept areas) for which the tests were designed. The reclassified content areas are labelled as follows:

1. Tools and equipment of occupations
2. Educational training requirements of occupations
3. Activities and duties required
4. Working conditions of occupations
5. Social status (income) of occupations
6. Industrial trends
7. Identification of jobs and job clusters
8. Information sources
9. Workers satisfaction
10. Career planning

It should be noted that the regrouped content areas are not totally independent of one another, and, therefore, in some cases an item could logically be classified in several content areas.

Test developers classified each item of each of the three tests into the content areas for which the tests were developed. This mapping of content areas for which the tests were developed can then be compared with teacher classifications, thus allowing for judgement of the content validity of each of the three tests. Teachers were asked to classify each item into the content areas which best identify the content of the item; in several instances one teacher believed that some questions could be classified equally well into two or more content areas.

Construct Validity

The sample used for the validation of the Career Education Cognitive Questionnaires consists of the students that were used for the test-retest reliability calculations.

The statistics employed to analyze the student biographical data with respect to mean scores included the t-test, one-way analysis of variance, and the non-parametric correlation, Kendall's Tau. In instances where the one-way analysis was employed, a Modified Least Squares Difference statistic was used to test for significant differences between all possible pairs of means. Kendall's Tau was used to determine the relationship between a student's rank on one variable with his score on the test (ranked).

CAREER EDUCATION COGNITIVE QUESTIONNAIRE FOR GRADES 1 THROUGH 3

Reliability

The reliability coefficients for the CECQ 1-3 ranged from .943 to .969 (see Table 1). These relationships indicate that students obtained approximately the same relative socre on the second administration of the test as on the first.

TABLE 1

TEST-RETEST REQLIABILITIES FOR CECQ 1-3

		Test		Retest		Test-Retest
Grade	N	Mean	S.D.	Mean	S.D.	Coefficient
1	80	25.44	5.71	25.77	5.62	.943
2	77	20.08	5.57	28.31	5.43	.953
3	89	29.52	5.86	29.43	5.74	.969

Face Validity

The five teachers reviewing the instrument for grades one through three were generally in agreement that all items on the revised form depicted career education concepts. Two items pertaining to the income of specific occupations as compared with other occupations of either higher or lower income were singled out for further discussion. Two teachers who identified these items as possible non-career education concepts were given further explanation and clarification by others in the group. Following these discussions, all of the teachers agreed that all items depicted career education concepts.

The importance of each career education concept depicted by the items was assessed by combining teacher responses to the importance of the concept and the emphasis they believed should be placed on the concept. Several items were classified as not important to the teachers. They believed the concepts in these items should be taught only to older children; i.e., fifth or sixth graders. Items selected as not important for first through third graders were those dealing with such words as florist, communication, and apprenticeship. Teachers felt the meanings of such words were not commonly understood by younger students. However, data obtained during prepilot and pilot testing of the revised instrument did not substantiate their concerns, with the majority of students correctly answering questions containing the identified words.

Content Validity

The evaluation instrument for grades one through three contains 40 questions, all of which were classified within the prescribed content areas (see Figure 2). The shaded areas represents classifications of the test developers and the numbers represent frequency of classification by in-service teachers. There seems to be general agreement among the reviewing teachers about which content area best described the content depicted by each of the items. This is evident in that for most items, three or more teachers selected the same content area. The CECQ 1-3 can be thought to have content validity, since all the teachers identified one of the pre-identified content areas as best describing the content of each question and teachers classified questions similarly to the test developers.

Grade Levels

Achievement tests should have the ability to identify maturation. In the case of the Career Education Cognitive Questionnaire, the ability to measure vocational maturity is important. Table 2 shows the differences in student mean scores by grade level within each of the three tests. Student mean scores for the CECQ 1-3 increased from 25.4 for the first grade to 29.5 for the third grade (see Table 2). The differences among grade levels are statistically significant at the .01 level. The increase in mean scores with an increase in grade level is also shown by the significant correlation (.01 level) between grade level and mean score (see Table 3). A conservative post hoc test (modified least squares difference) of significant difference between all possible pairs of mean scores (grades 1 and 2, 2 and 3, and 1 and 3) did not reveal where the differences were.

TABLE 2

DIFFERENCES AMONG MEAN SCORES BY GRADE LEVEL FOR CECQ 1-3

Grade	First	Second	Third	F-Ratio	Significance
Mean	25.4	28.0	29.5	11.4	.000**

**Significant at .01
* Significant at .05

TABLE 3

RELATIONSHIP OF STUDENT SCORES TO GRADE LEVEL FOR CECQ 1-3

Correlation	Significance
.282	.001**

**Significant at .01
* Significant at .05

FIGURE 2

CONTENT CLASSIFICATION OF CECQ 1-3
AS JUDGED BY TEST DEVELOPERS AND INSERVICE TEACHERS

	Tool & Equipment of an Occupation	Education Training Requirements	Abilities and Duties Required	Working Conditions	Social Status (income)	Industrial Trends	Identification of Jobs and Job Clusters	Information Sources	Worker Satisfaction	Career Planning	Other Career Education Content Area	Not Career Education
1	5											
2	5											
3			2				3					
4	5											
5			1				4					
6	5											
7			3				2					
8		5										
9			4				1					
10			4				1					
11			4				1					
12				4			1					
13		5										
14			4	1								
15			3				1		1			
16					5							
17			4				1					
18			2	1			2					
19			2				3					
20			4				1					
21			3				2					
22		4					1					
23							5					
24				4			1					
25		1		2			2					
26					5							

FIGURE 2 (continued)

	Tool & Equipment of an Occupation	Education Training Requirements	Abilities and Duties Required	Working Conditions	Social Status (Income)	Industrial Trends	Identification of Jobs and Job Clusters	Information Sources	Worker Satisfaction	Career Planning	Other Career Education Content Area	Not Career Education
27			2	2								
28			3				2					
29	5											
30			3				2					
31			3				1			1		
32			1	3			1					
33			1	2			1		1			
34		2					2	1				
35			3				2					
36	4			1								
37				5								
38				5								
39				1			1		3			
40				1	4							

Teacher Emphasis

During the initial test session, teachers were asked how much time (hours per week) during the past year they had devoted to teaching the career education concepts, which the Career Education Cognitive Questionnaire was designed to measure. The amount of time teachers emphasized the concepts was classified into groups of low emphasis and high emphasis. Since there were only four teachers at each grade level, a difference between low and high emphasis in some cases could not be obtained. Grade levels were collapsed to obtain one group of low and one group of high emphasis per test. The distributions of both high and low emphasis groups were carefully reviewed to insure that each group contained similar numbers of students from each of the three grade levels involved in the groupings. The amount of teacher's emphasis on Career Education for the CECQ 1-3 was:

low emphasis 0.5 - 2.5 hours per week (N = 72)
high emphasis 4.5 - 7.0 hours per week (N = 91)

A comparison of low and high emphasis groups in terms of mean test scores showed that students in grades one through three low emphasis group obtained a mean of 28.7, with students in the high emphasis group having a mean of 28.5 (see Table 4). This difference was not significant.

TABLE 4

TEST FOR DIFFERENCES AMONG MEANS BY LOW TEACHER EMPHASIS VS. HIGH TEACHER EMPHASIS FOR THE CECQ 1-3

Emphasis			
Low	High	t-Value	Significance
28.7	28.5	.21	.831

**Significant at .01
* Significant at .05

Sex

Another important aspect of an achievement test is its fairness to both males and females. Students were grouped according to their sex, and mean scores calculated and tested for differences.

The difference between mean scores for males and females for the CECQ 1-3 showed the only significant difference (at the .01 level) at the third grade (see Table 5). At grade three, males had an advantage of 1.6 points over females. At grades one and two, however, there were not significant differences between the sexes.

TABLE 5

TEST FOR DIFFERENCE AMONG MEANS
AS AFFECTED BY SEX FOR THE CECQ 1-3

Grade	Males	Females	t-Value	Significance
1	25.9	26.1	-.23	.817
2	28.8	27.6	1.18	.243
3	31.1	28.5	2.89	.006**

**Significant at .01
* Significant at .05

Father's Occupation

Students were asked to identify the occupations of their fathers. In cases where the fathers did not live at home, the students were asked to identify the occupation of the head of the household. The occupation was then classified according to the following categories:

1 = unskilled
2 = semi-skilled
3 = skilled
4 = semi-professional & small business management
5 = professional and managerial II
6 = professional and managerial I

Mean scores were then calculated for each occupational level of the father for each grade level and a one-way ANOVA used to compare the means.

Mean scores for father's occupation at grades one through three ranged from a low of 25.0 to a high of 32.7 (see Table 6). For grades one, two, and three, there were no significant differences among mean scores grouped according to the level of father's occupation. The correlation between mean score and level of father's occupation at grade one revealed a slight negative relationship. At grades two and three, there were positive relationships; however, none of these coefficients were statistically significant (see Table 7). Since there were no significant differences between means using a one-way ANOVA, a test for significance of all possible pairs was not calculated.

TABLE 6

DIFFERENCES IN MEAN SCORES AS RELATED TO
FATHER'S OCCUPATIONAL LEVEL FOR THE CECQ 1-3

	Father's Occupational Level							
Grade	1	2	3	4	5	6	F-Ratio	Significance
1	---	28.0	26.7	25.1	26.0	---	.184	.906
2	---	25.0	29.7	30.0	27.3	31.3	.964	.442
3	---	29.8	28.0	29.9	32.7	---	.788	.510

**Significant at .01
* Significant at .05

TABLE 7

RELATIONSHIP OF MEAN SCORE TO FATHER'S
OCCUPATIONAL LEVEL FOR THE CECQ 1-3

Grade	Correlation	Significance
1	-.078	.273
2	.127	.147
3	.156	.098

**Significant at .01
* Significant at .05

Father's Education

Students were asked to identify their father's highest level of education. In cases where students did not live with their fathers, the education of the head of the household was obtained. Father's education was then classified into the following categories:

1 = 1 through 5 years
2 = 6 through 8 years
3 = 9 through 11 years
4 = high school graduate (12 years)
5 = 1 through 3 years of college
6 = college graduate
7 = college graduate plus additional graduate studies

The mean scores of students were calculated within each level of father's education for each grade.

The analysis of mean scores among level of father's education for the CECQ 1-3 showed no significant difference at any grade level (see Table 8). There was no significant correlation between mean scores and level of father's education at grades one, two, or three (see Table 9).

TABLE 8

DIFFERENCES IN MEAN SCORES AS AFFECTED BY FATHER'S EDUCATIONAL LEVEL FOR THE CECQ 1-3

Grade	1	2	3	4	5	6	7	F-Ratio	Significance
1	---	28.0	26.7	25.1	26.0	---	30.0	.328	.857
2	---	25.0	29.7	30.0	27.3	31.3	30.0	.783	.570
3	---	29.8	28.0	29.0	32.7	---	31.7	.721	.584

**Significant at .01
* Significant at .05

TABLE 9

RELATIONSHIP OF STUDENT SCORES TO FATHER'S EDUCATIONAL LEVEL FOR THE CECQ 1-3

Grade	Correlation	Significance
1	0	.500
2	.109	.175
3	.181	.058

**Significant at .01
* Significant at .05

CAREER EDUCATION COGNITIVE QUESTIONNAIRE FOR GRADES 4 THROUGH 6

Reliabilities

The test-retest reliabilities for the CECQ 4-6 ranged from .895 to .906 (see Table 10). This range of reliabilities indicates that this test is stable over the two week period.

TABLE 10

TEST-RETEST RELIABILITIES FOR CECQ 4-6

		Test		Retest		Test-Retest
Grade	N	Mean	S.D.	Mean	S.D.	Coefficient
4	83	31.21	7.66	31.80	7.43	.895
5	105	35.12	8.57	34.37	8.33	.863
6	108	35.30	7.75	36.40	3.20	.906

Face Validity

The five teachers reviewing the evaluation instrument for grades four through six felt that all the items depicted career education concepts. The teachers suggested that all items depicted a concept that should be given some emphasis in grades four through six, but that some items might receive greater emphasis there than others, with some items given greater attention in junior and senior high school.

Content Validity

The reviewing teachers of the CECQ 4-6 agreed on the same content area in 36 out of the 55 items (see Figure 3). In five cases, one teacher could not classify an item into only one of the content areas, but felt that could be classified equally well into two or more content areas. Figure 3 shows that teachers classified questions in a similar pattern as the test developers. The shaded areas are test developers classification and the numbers refer to the frequency of inservice teachers classifications. The CECQ 4-6 can be said to have content validity since in all cases, teachers identified the content of a question as one of the content areas for which the tests were developed and teachers classified the content areas of questions similarly to the classifications made by the test developers.

FIGURE 3

CONTENT CLASSIFICATIONS OF CECQ 4-6
AS JUDGED BY TEST DEVELOPERS AND INSERVICE TEACHERS

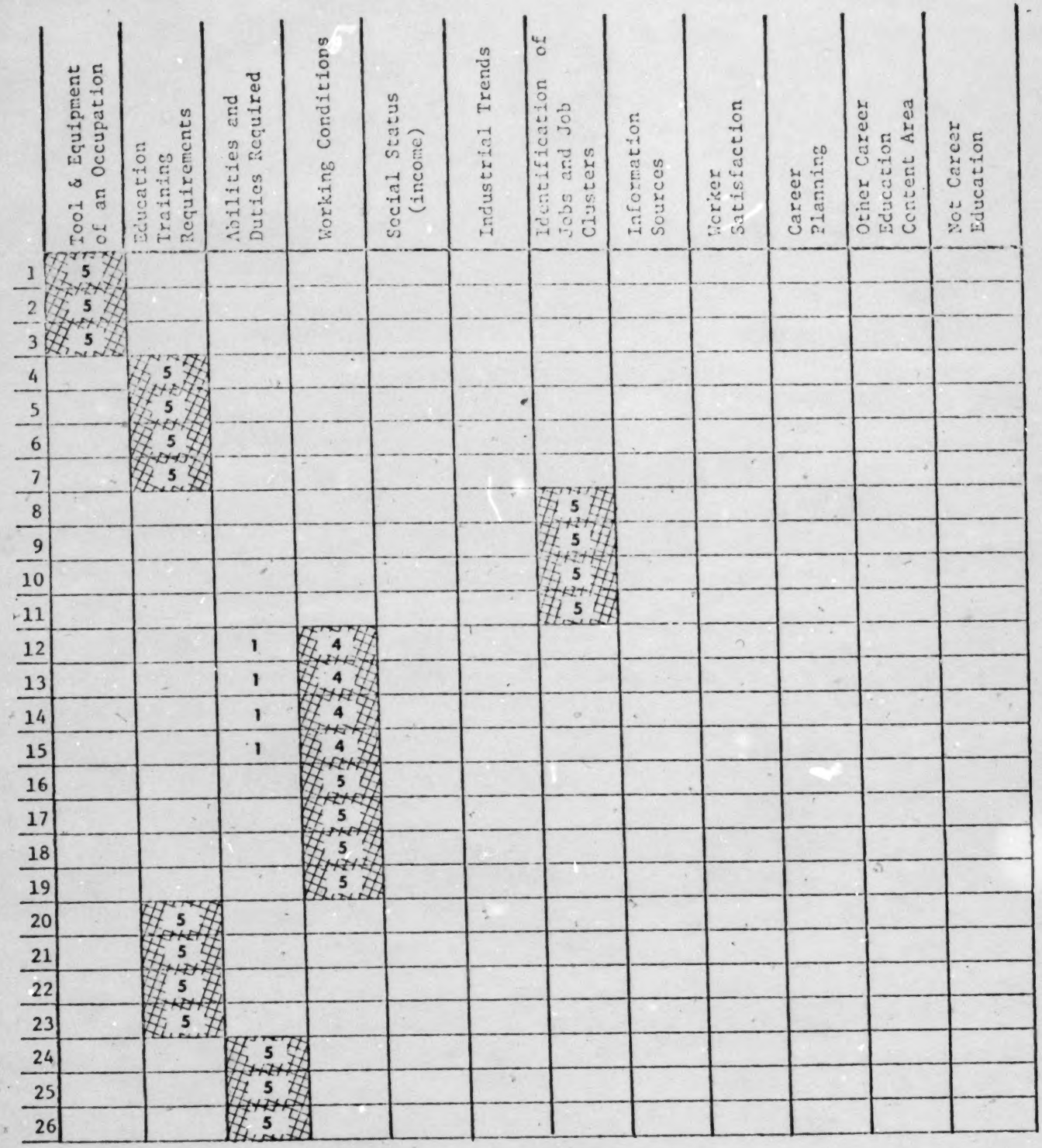

FIGURE 3 (continued)

	Tool & Equipment of an Occupation	Education Training Requirements	Abilities and Duties Required	Working Conditions	Social Status (Income)	Industrial Trends	Identification of Jobs and Job Clusters	Information Sources	Worker Satisfaction	Career Planning	Other Career Education Content Area	Not Career Education
27			5									
28		5										
29		5										
30		5										
31		5										
32		5										
33		5										
34		5										
35		5										
36	3						1				1	
37		1			1				2	1		
38					4						1	
39			1	2					1	1		
40		4								1		
41			4								1	
42		5										
43		5										
44							5					
45							3		1	1		
46							3		1	1		
47			1	1	1				2			
48					2	1		1			1	
49				3	1						1	
50			1				4					
51	1	4										
52					2			3				
53								5				
54			2					1	2			
55					4		1					

Grade Levels

The CECQ 4-6 showed mean score increases from 31.2 for fourth grade to 35.2 for the sixth grade (see Table 11). This is significant at the .01 level. The correlation between grade level and mean score is also statistically significant at the .01 level (see Table 12). Tests for significant difference between all possible pairs of mean scores (grades 4 and 5, 5 and 6, and 4 and 6) did not reveal where the differences were.

TABLE 11

DIFFERENCES AMONG MEANS BY GRADE LEVEL FOR CECQ 4-6

Grade	Fourth	Fifth	Sixth	F-Ratio	Significance
Mean	31.2	35.1	35.2	5.9	.001**

**Significant at .01
* Significant at .05

TABLE 12

RELATIONSHIP OF STUDENT SCORES TO GRADE LEVEL FOR CECQ 4-6

Correlation	Significance
.219	.001**

**Significant at .01
* Significant at .05

Teacher Emphasis

During the initial test session, teachers were asked how much time (hours per week) during the past year they had devoted to teaching the career education concepts, which the Career Education Cognitive Questionnaire was designed to measure. The amount of time teachers emphasized the concepts was classified into groups of low emphasis and high emphasis. Since there were only four teachers at each grade level, a difference between low and high emphasis, in some cases, could not be obtained. Grade levels were collapsed to obtain one group of low and one group of high emphasis per test. The distributions of both high and low emphasis groups were carefully reviewed to insure that each group contained similar numbers of students from each of the three grade levels involved in the groupings. The amount of teacher's emphasis on Career Education for each of the test levels are as follows:

low emphasis 0.5 - 2.0 hours per week (N = 126)
high emphasis 5.0 - 8.5 hours per week (N = 117)

with the CECQ 4-6 males and females scored equally well at all grade levels (see Table 13).

TABLE 13

TEST FOR DIFFERENCES AMONG MEANS BY LOW TEACHER EMPHASIS VS. HIGH TEACHER EMPHASIS FOR THE CECQ 4-6

Emphasis			
Low	High	t-Value	Significance
34.9	34.4	.57	.566

**Significant at .01
* Significant at .05

Sex

Another important aspect of an achievement test is its fairness to both males and females. Students were grouped according to their sex, and mean scores calculated and tested for differences.

The differences between mean scores for males and females for the CECQ 4-6 showed not to be significant (see Table 14).

TABLE 14

TEST FOR DIFFERENCE AMONG MEANS AS AFFECTED BY SEX FOR THE CECQ 4-6

Grade	Males	Females	t-Value	Significance
4	31.5	31.4	.02	.981
5	36.8	35.2	1.23	.222
6	34.8	35.8	-.75	.454

**Significant at .01
* Significant at .05

Father's Occupation

Students were asked to identify the occupations of their fathers. In cases where the fathers did not live at home, the students were asked to identify the occupation of the head of the household. The occupation was then classified according to the following actegories:

1 = unskiiled
2 = semi-skilled
3 = skilled
4 = semi-professional & small business management
5 = professional and managerial II
6 = professional and managerial I

Mean test socres were then calculated for each occupational level of the father for each grade level and a one-way ANOVA used to compare the means.

Results of the CECQ 4-6 showed no significant difference among mean scores for level of father's occupation at any grade level (see Table 15). Table 16 shows a positive correlation at grade six which is significant at the .01 level. Relationships at grades four and five did not prove to be significant.

TABLE 15

DIFFERENCES IN MEAN SCORES AS RELATED TO FATHER'S OCCUPATIONAL LEVEL FOR THE CECQ 4-6

	Father's Occupational Level							
Grade	1	2	3	4	5	6	F-Ratio	Significance
4	34.7	29.7	32.9	31.3	---	---	.442	.724
5	38.2	37.7	40.1	36.1	39.2	---	.943	.447
6	29.2	26.2	33.4	35.2	40.0	38.2	1.483	.217

**Significant at .01
* Significant at .05

TABLE 16

RELATIONSHIP OF MEAN SCORE TO FATHER'S OCCUPATIONAL LEVEL FOR THE CECQ 4-6

Grade	Correlation	Significance
4	.018	.426
5	-.009	.464
6	.254	.005**

**Significant at .01
* Significant at .05

Father's Education

Students were asked to identify their father's highest level of education. In cases where students did not live with their fathers, the education of the head of the household was obtained. Father's education was then classified into the following categories:

1 = 1 through 5 years
2 = 6 through 8 years
3 = 9 through 11 years
4 = High school graduate (12 years)
5 = 1 through 3 years of college
6 = College graduate
7 = College graduate plus additional graduate studies

The mean scores of students were calculated within each level of father's education for each grade.

At grades four through six, there again were no significant differences among mean scores for levels of father's education (see Table 17), but there was a nearly significant correlation between mean score and father's educational level at grade five [.05 level] (see Table 18).

TABLE 18

DIFFERENCES IN MEAN SCORES AS AFFECTED BY FATHER'S EDUCATIONAL LEVEL FOR THE CECQ 4-6

Grade	1	2	3	4	5	6	7	F-Ratio	Significance
4	---	---	29.6	32.3	32.5	32.9	---	.560	.644
5	---	---	37.5	36.6	40.6	46.2	39.2	1.380	.256
6	---	34.2	28.5	34.7	38.9	38.2	38.2	1.165	.341

**Significant at .01
* Significant at .05

TABLE 19

RELATIONSHIP OF STUDENT SCORES TO FATHER'S EDUCATIONAL LEVEL FOR THE CECQ 4-6

Grade	Correlation	Significance
4	.140	.073
5	.217	.013*
6	.151	.059

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Reliabilities

The reliability coefficients obtained for the CECQ 7-9 ranged from .836 to .906 (see Table 20). Although the reliabilities obtained for the CECQ 7-9 were the lowest of the three tests, the scores can be considered stable over the two week period.

TABLE 20

TEST-RETEST RELIABILITIES FOR CECQ 7-9

		Test		Retest		Test-Retest
Grade	N	Mean	S.D.	Mean	S.D.	Coefficient
7	100	26.92	8.70	27.43	8.63	.836
8	92	31.31	10.53	31.75	10.34	.863
9	90	32.89	11.20	33.41	10.78	.906

Face Validity

The five teachers reviewing the evaluation instrument for grades seven through nine were quite diverse in their comments. Four teachers stated that all questions depicted career education concepts, with the fifth suggesting that several concepts were not related to career education. Assessment of the importance of the concepts and teacher emphasis varied greatly. Two teachers believed several concepts were not important, but should be given some emphasis in the classrooms of grades seven through nine. The majority of teachers believed that most of the questions depicted important concepts and, therefore, should be given medium to high emphasis in grades 7-9 classrooms.

Content Validity

The CECQ 7-9 contains a total of 57 questions. In all but three cases, items were classified into the identified content areas with the majority of teachers agreeing on one content area (see Figure 4). Shaded areas represent test developer classifications and the numbers represent frequency of classification by inservice teachers. In three cases, one of the five teachers could not classify an item since he felt the item depicted more than one content area. Figure 4 shows that teachers classified question content in a pattern similar to that of the test developers. Since all of the questions depict one or more of the content areas which the test was

FIGURE 4

CONTENT CLASSIFICATIONS OF CECQ 7-9
AS JUDGED BY TEST DEVELOPERS AND INSERVICE TEACHERS

	Tool & Equipment of an Occupation	Education Training Requirements	Abilities and Duties Required	Working Conditions	Social Status (Income)	Industrial Trends	Identification of Jobs and Job Clusters	Information Sources	Worker Satisfaction	Career Planning	Other Career Education Content Area	Not Career Education
1	1						4					
2		1	2				2					
3			1				4					
4			1	1	3							
5				5								
6			3				2					
7						3	1	1				
8				1	3			1				
9							4	1				
10							4	1				
11			3				1	1				
12				1	3			1				
13			1				4					
14				1			4					
15							5					
16			4				1					
17			4	1								
18								4			1	
19								5				
20			1			1		2	1			
21			1					4				
22								5				
23			1					4				
24	1		4									
25	1		4									
26			2	3								

FIGURE 4 (continued)

	Tool & Equipment of an Occupation	Education Training Requirements	Abilities and Duties Required	Working Conditions	Social Status (income)	Industrial Trends	Identification of Jobs and Job Clusters	Information Sources	Worker Satisfaction	Career Planning	Other Career Education Content Area	Not Career Education
27		2	3									
28		1	4									
29		1				3				1		
30		1				3		1				
31		1	2	1		1						
32		1				4						
33	1					3				1		
34						3				2		
35			2			3						
36						4				1		
37		5										
38		3				1	1					
39		1	2				2					
40		5										
41		5										
42		1							1	3		
43		2							1	2		
44		2	1							2		
45		5										
46								5				
47								1		4		
48		4					1					
49		5										
50		2								3		
51		2								3		
52							3			2		
53										5		
54										5		
55							3			2		
56										5		
57							2			3		

developed to measure, and teacher classifications were very similar to those made by the test developers, the CECQ 7-9 can be said to have content validity.

Grade Levels

The CECQ 7-9 had mean scores ranging from 26.9 for the seventh grade to 32.8 for the ninth grade (see Table 21). This is statistically significant at the .01 level. The correlation between grade level and mean score was also significant at the .01 level (see Table 22). Post hoc tests between all possible mean score pairs (grades 7 and 8, 8 and 9, and 7 and 9) did not reveal significant differences.

TABLE 21

DIFFERENCES AMONG MEAN SCORES BY GRADE LEVEL FOR CECQ 7-9

Grade	Seventh	Eighth	Ninth	F-Ratio	Significance
Mean	26.9	31.3	32.8	9.6	.001**

**Significant at .01
* Significant at .05

TABLE 22

RELATIONSHIP OF STUDENT SCORES TO GRADE LEVEL FOR CECQ 7-9

Correlation	Significance
.207	.001**

**Significant at .01
* Significant at .05

Teacher Emphasis

During the initial test session, teachers were asked how much time (hours per week) during the past year they had devoted to teaching the career education concepts, which the Career Education Cognitive Questionnaire was designed to measure. The amount of time teachers emphasized the concepts was classified into groups of low emphasis and high emphasis. Since there were only four teachers at each grade level, a difference between low and high emphasis in some cases could not be obtained. Grade levels were collapsed to obtain one group of low and one group of high emphasis per test. The distributions of both high and low emphasis groups were carefully reviewed to insure that each group contained similar numbers of students from each of the three grade levels involved in the groupings. The amount of teacher's emphasis on Career Education for each of the test levels are as follows:

low emphasis 1.0 - 2.5 hours per week (N = 76)
high emphasis 3.5 - 6.0 hours per week (N = 47)

For grades seven through nine the low emphasis group attained a mean of 31.6, with the high emphasis group having a mean of 32.1 (see Table 23). The difference between the low and high emphasis groups also proved insignificant.

TABLE 23

TEST FOR DIFFERENCES AMONG MEANS BY LOW TEACHER EMPHASIS VS. HIGH TEACHER EMPHASIS FOR THE CECQ 7-9

Emphasis			
Low	High	t-Value	Significance
31.6	32.1	-.45	.651

**Significant at .01
* Significant at .05

Sex

The results of grades seven through nine showed that there were no significant differences between male and female scores (see Table 24).

TABLE 24

TEST FOR DIFFERENCE AMONG MEANS AS AFFECTED BY SEX FOR THE CECQ 7-9

Grade	Males	Females	t-Value	Significance
7	26.1	28.3	-1.30	.197
8	31.7	34.2	-1.40	.164
9	33.8	36.6	-1.68	.098

**Significant at .01
* Significant at .05

Father's Occupation

Students were asked to identify the occupations of their fathers. In cases where the fathers did not live at home, the students were asked to identify the occupation of the head of the household. The occupation was then classified according to the following categories:

1 = unskilled
2 = semi-skilled
3 = skilled
4 = semi-professional & small business management
5 = professional and managerial II
6 = professional and managerial I

Mean test scores were then calculated for each occupational level of the father for each grade level and a one-way ANOVA used to compare the means.

At grades 7 through 9 differences in mean scores were significant (.01) at grade eight only. Differences at grades seven and nine did not prove significant at the .01 level (see Table 25). The correlation between mean scores and father's occupation at grades seven through nine were positive, but only the relationship at the eighth grade proved significant at the .01 level (see Table 26). An attempt to identify significantly different pairs of groups at grade eight was unsuccessful.

TABLE 25

DIFFERENCES IN MEAN SCORES AS RELATED TO FATHER'S OCCUPATIONAL LEVEL FOR THE CECQ 7-9

	Father's Occupational Level							
Grade	1	2	3	4	5	6	F-Ratio	Significance
7	18.7	28.3	25.7	27.5	28.8	---	.961	.432
8	13.3	26.9	32.9	31.7	27.9	38.3	4.380	.001**
9	15.3	31.6	37.1	35.9	33.3	---	3.455	.012*

**Significant at .01
* Significant at .05

TABLE 26

RELATIONSHIP OF MEAN SCORE TO FATHER'S OCCUPATIONAL LEVEL FOR THE CECQ 7-9

Grade	Correlation	Significance
7	.092	.083
8	.256	.001**
9	.054	.229

**Significant at .01
* Significant at .05

Father's Education

Students were asked to identify their father's highest level of education. In cases where students did not live with their fathers, the education of the head of the household was obtained. Father's education was then classified into the following categories:

1 = 1 through 5 years
2 = 6 through 8 years
3 = 9 through 11 years
4 = High school graduate (12 years)
5 = 1 through 3 years of college
6 = College graduate
7 = College graduate plus additional graduate studies

The mean scores of students were calculated within each level of father's education for each grade.

At grades seven and nine, differences among means for the various levels of father's education proved insignificant (see Table 27). The correlations between mean scores and father's educational level proved to be positive at grades seven through nine, with grades seven and eight significant at the .01 level (see Table 28).

TABLE 27

DIFFERENCES IN MEAN SCORES AS AFFECTED BY FATHER'S EDUCATIONAL LEVEL FOR THE CECQ 7-9

Grade	1	2	3	4	5	6	7	F-Ratio	Significance
7	9.3	25.2	26.9	27.2	32.0	31.3	29.3	1.692	.131
8	33.3	31.9	29.1	31.6	28.3	34.9	41.2	2.940	.012*
9	---	32.8	33.6	36.1	27.7	31.8	36.9	1.057	.390

**Significant at .01
* Significant at .05

TABLE 28

RELATIONSHIP OF STUDENT SCORES TO FATHER'S EDUCATIONAL LEVEL FOR THE CECQ 7-9

Grade	Correlation	Significance
7	.168	.006**
8	.228	.001**
9	.107	.073

**Significant at .01
* Significant at .05

CREDITS

This paper consists of excerpts from the following research studies:

Rader, Billie T. The Revision and Validation of the "Career Education Cognitive Questionnaires" Ph.D. Dissertation, University of Minnesota, August, 1975.

Rader, Billie T. and Brandon B. Smith. Administration Procedures and Technical Report of the Career Education Cognitive Questionnaires. Minnesota Research Coordinating Unit, University of Minnesota. Copyright, 1975.